What is claimed is:

1. A method of forming a semiconductor device, comprising:

providing a trench in a surface of an insulating film on a substrate, wherein said trench is covered by a barrier layer and a seed layer on said barrier layer;

depositing a metal film in said trench so as to form an embedded interconnect; and

while rotating said substrate, electrolessly plating a protective film having a thickness in a range of from 0.1 nm to 500 nm onto a surface of said embedded interconnect using an electroless-plating liquid without using palladium, said electroless-plating liquid comprising:

(i) cobalt ions;

(ii) a complexing agent; and

(iii) an alkylamine borane that is free from alkali metal.

2. The method according to claim 1, further comprising polishing a surface of said metal film before said electrolessly plating.

3. The method according to claim 1, wherein said electroless-plating liquid further comprises at least one of

(i) a stabilizer selected from one or more kinds of heavy metal compounds and sulfur compounds, and

(ii) a surfactant.

4. The method according to claim 1, wherein said electroless-plating liquid has a pH adjusting agent that is free from alkali metal.

5. The method acccording to claim 1, wherein said protective film has a thickness within a range of from 10nm to 100nm.

6. A method of forming a semiconductor device, comprising:

providing a trench in a surface of an insulating film on a substrate, wherein said trench is covered by a barrier layer and a seed layer on said barrier layer;

depositing a metal film in said trench so as to form an embedded interconnect; and

while rotating said substrate, electrolessly plating a protective film having a thickness in a range of from 0.1 nm to 500 nm onto a surface of said embedded interconnect using an electroless-plating liquid without using palladium, said electroless-plating liquid comprising:

(i) cobalt ions;

(ii) a complexing agent;

(iii) a compound containing a refractory metal; and

(iv) an alkylamine borane that is free from alkali metal.

7. The method according to claim 6, further comprising polishing a surface of said metal film before said electrolessly plating.

8. The method according to claim 6, wherein said refractory compound comprises at least one of tungsten and molybdenum.

9. The method according to claim 6, wherein said electroless-plating liquid further comprises at least one of

(i) a stabilizer selected from one or more kinds of heavy metal compounds and sulfur compounds, and

(ii) a surfactant.

10. The method according to claim 6, wherein said electroless-plating liquid has a pH adjusting agent that is free from alkali metal.

11. The method acccording to claim 6, wherein said protective film has a thickness within a range of from 10nm to 100nm.